were not found to be a problem because of the only temporary use of the large aperture.

The addition of the aperture system described above has resulted in a still more flexible instrument and provides a necessary control over the technique which previously was not easily available.

* This paper is based on work performed under Contract No. AT-04-1-GEN-12 between the U. S. Atomic Energy Commission and the University of California at Los Angeles.

[1] "A New External Objective Aperture Centering and Interchanging Device for the RCA emu Electron Microscope," Rev. Sci. Instr. 24, 269–271 (1953).

Sealing Fluid for Ground Glass Joints in Liquid Helium II

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THE convenience of a ground joint for rapid assembly and dismantling is counteracted in the case of apparatus to be used immersed in liquid helium by the difficulty in obtaining a seal which is leakproof in the helium II range, i.e., at temperatures below 2.186°K, where the phenomenon of superfluidity is encountered.

High-vacuum lubricants, such as Apiezon and silicone greases, and, again, glycerine, are frequently used, but we have not found these to be satisfactory. It was desired to find a fluid with a low freezing point, such as would retain its fluidity down to a temperature where the expansion coefficient of glass is very small. A second requirement was reasonably small room temperature and vapor pressure, such that only a small loss by evaporation would occur during the interval of several minutes frequently necessary for completion of assembly of the apparatus and commencement of cooling.

With these considerations in view it appeared that *n*-propyl alcohol was a readily available substance possessing a wide liquid range and that the addition of glycerine to this should be efficacious in reducing the volatility. The most favorable composition of the mixture could be found, presumably, by trial and error; but the very first combination of roughly 2 parts (by volume) of glycerine to 3 parts of 1-propanol proved eminently satisfactory and no further tests were made.

The one essential precaution to be observed is slow cooling down to liquid air temperature. In the particular case for which the authors have used this seal the precooling is determined by additional factors and is always in excess of three hours (the liquid air never coming into direct contact with the joint). The mixture has been used only for joints in glass (both soft and Pyrex) but would presumably be at least as efficient as the greases, etc., mentioned above in the case of metal-to-metal ground joints.

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Link Coupling for Nuclear Magnetic Resonance

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IN an attempt to use proton magnetic resonance for regulation of magnetic fields of 10 kilogauss or more, it has been found that the conventional probe sample holder used by other investigators[1] gave inadequate, if any, resonance lines above 40 mc/sec. In such arrangements, the oscillator tank coil is at the end of a coaxial probe. The weaker lines at higher frequencies are attributed to the fact that the distributed inductance of the coaxial line becomes important as frequency is increased.

To overcome this difficulty, we have employed a link-type coupling arrangement (see Fig. 1). This allows one to utilize

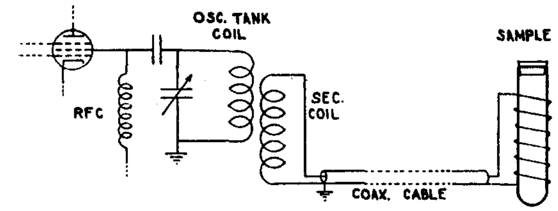

Fig. 1.

lumped circuit elements for the oscillator tank circuit which are completely contained within the oscillator compartment of the unit. The coil containing the sample is coupled with the oscillator tank coil by means of an untuned secondary winding placed around the oscillator coil. A coaxial cable connects this secondary winding with the coil containing the sample, and this allows the sample to be many feet from the oscillator.

Experience has shown that it is not necessary to match the impedance of the coils to that of the coaxial cable. The best proton absorption lines were obtained when the secondary coil was tightly coupled to the primary and actually consisted of more turns; for example, our oscillator coil is made of 5 turns of No. 8 wire, self-supporting with a $\frac{3}{4}$-in. diameter, 1 in. long. This is covered with a layer of Teflon tape on which the secondary is wound, consisting of 6 turns of No. 24 wire $\frac{1}{4}$ in. long. Due to impedances reflected into the oscillator tank circuit, more than one mode of oscillation is possible,[2] and as a result of this a dead spot of several megacycles may be expected. This dead spot can be moved by changing the length of the coaxial cable connecting the secondary and the sample coil.

The same coupling arrangement has been used on an rf bridge of the Bloembergen type[3] and is presumably applicable to others. Blind spots have not been observed here since these are passive circuits. A great reduction in frequency drift and in microphonics in the rf bridge has been obtained by means of the coupling arrangement described above.

[1] H. W. Knoebel and E. L. Hahn, Rev. Sci. Instr. 22, 904–911 (1951).
[2] H. J. Reich, *Very High-frequency Techniques* (McGraw-Hill Book Company, Inc., New York, 1947), p. 344.
[3] Bloembergen, Purcell, and Pound, Phys. Rev. 73, 679 (1948).

New Instruments

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These descriptions are based on information supplied by the manufacturer and in some cases from independent sources. The Review *assumes no responsibility for their correctness.*

Color-Translating Ultraviolet Microscope

A new type automatic ultraviolet microscope, the prototype of which was developed at the Polaroid Corporation with the support of the Office of Naval Research and the American Cancer Society, is now available.

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